Supplementary Materials

Effect of prolonged microcirculation time after thrombectomy on the outcome of acute stroke

Contents

Supplemental material

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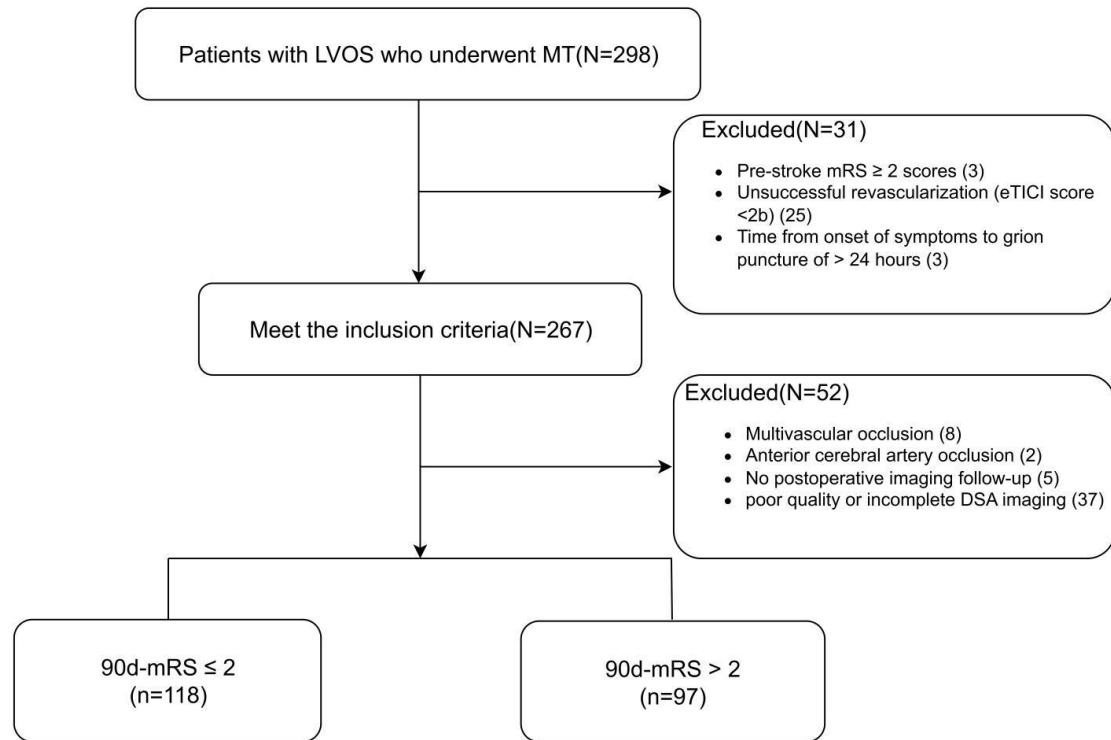
Supplementary Figures

Figure S1 Flow chart of the inclusion of the study population.

LVOS, large vessel occlusive stroke; mRS, modified Rankin Scale; MT, mechanical

thrombectomy; eTICI, expended Thrombolysis in Cerebral Infarction

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Table S1 Baseline Clinical Characteristics of Patients with High and Low mCCT Groups

Variables	mCCT≤3.68 (n=122)	mCCT>3.68 (n=93)	P-value
Demographic characteristics			
Age, y, median (IQR)	68(60,76)	71(64,77)	0.097
Male, n (%)	76(62.3)	49(52.7)	0.157
Past Medical History, n (%)			
Hypertension	66(54.1)	61(65.6)	0.090
Diabetes mellitus	11(9.0)	11(11.8)	0.500
Atrial fibrillation	67(54.9)	57(61.3)	0.349
Clinical data			
Admission SBP, median (IQR)	150(137,167)	158(139,170)	0.154
Admission DBP, median (IQR)	85(77,92)	82(74,93)	0.681
Admission NIHSS, median, (IQR)	13(11,17)	14(12,18)	0.057
Admission ASPECT, median, (IQR)	9(7,10)	8(7,10)	0.255
IV-rtPA, n (%)	13(10.7)	19(20.4)	0.046
Occlusion site, n (%)			0.663
ICA	49(40.2)	42(45.2)	
MCA-M1	64(52.5)	43(46.2)	
MCA-M2	9(7.4)	8(8.6)	
Tandem occlusion	16(13.1)	7(7.5)	0.189
TOAST type, n (%)			0.253
LAA	32(26.2)	25(26.9)	
CE	72(59.0)	61(65.6)	
Others	18(14.8)	7(7.5)	
Anesthesia mode, n (%)			0.911
General Anesthesia	13(10.7)	11(11.8)	
Local Anesthesia	73(59.8)	53(57.0)	
Conscious Sedation	36(29.5)	29(31.2)	
Procedure process			
OTP, median (IQR)	293(210,360)	312(240,420)	0.029
OTR,median (IQR)	350(260,440)	373(280,506)	0.049
Collateral, n (%)			0.996
poor	38(31.1)	29(31.2)	
good	84(68.9)	64(68.8)	
First Attempt Approach, n (%)			0.252
Stent retriever	40(32.8)	19(20.4)	
Direct aspiration	54(44.3)	48(51.6)	
Stent retriever + aspiration	7(5.7)	6(6.5)	
Balloon/stenting angioplasty	21(17.2)	20(21.5)	
eTICI			<0.001

2b50 (50-66%)	9(7.4)	19(20.4)	
2b67 (67-89%)	6(4.9)	21(22.6)	
2c	21(17.2)	12(12.9)	
3	86(70.5)	41(44.1)	
Any ICH within 24h	23(18.9)	30(32.3)	0.024
Parenchymal hematoma within 24h	8(6.6)	14(15.1)	0.042
Symptomatic ICH within 24h	4(3.3)	7(7.5)	0.214

Abbreviations: ASPECT, Alberta Stroke Program Early CT; CE, cardioembolic; DBP, diastolic blood pressure; eTICI, expended Thrombolysis in Cerebral Infarction; ICA, internal carotid artery; ICH, intracerebral hemorrhage, IQR, interquartile range; IV-rtPA, intravenous alteplase; LAA, large-artery atherosclerosis; MCA-M1, M1 segment of the middle cerebral artery; MCA-M2, M2 segment of the middle cerebral artery; mCCT, microvascular cerebral circulation time; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; OTP, onset-to-puncture time; OTR, onset-to-reperfusion time; SBP, systolic blood pressure; SD, standard deviation; TOAST, the Trial of ORG 10172 in Acute Stroke Treatment

Table S2 Logistic Regression Analyses for mCCT>3.68 s

Independent variable	Aadjusted OR(95%CI)	P-value
Model1		
OTP	1.001(0.999-1.002)	0.238
IV-rtPA	1.686(0.739-3.847)	0.215
eTICI		
2b50	Reference	
2b67	1.575(0.467-5.313)	0.464
2c	0.285(0.098-0.833)	0.022
3	0.233(0.097-0.563)	0.001
Model2		
OTR	1.001(0.999-1.002)	0.210
IV-rtPA	1.701(0.745-3.886)	0.208
eTICI		
2b50	Reference	
2b67	1.545(0.458-5.215)	0.483
2c	0.285(0.098-0.831)	0.022
3	0.227(0.094-0.548)	0.001

Abbreviations: CI, confidence intervals; eTICI, expanded Thrombolysis in Cerebral Infarction; IV-rtPA, intravenous alteplase; mCCT, microvascular cerebral circulation time; OR, odds ratio; OTP, onset-to-puncture time; OTR, onset-to-reperfusion time

Table S3 Baseline Clinical Characteristics of Patients with and without Intracerebral Hemorrhage

Variables	Any ICH(+) (n=53)	Any ICH(-) (n=162)	P-value	Parenchymal hematoma(+) (n=22)	Parenchymal hematoma(-) (n=193)	P-value
Demographic characteristics						
Age, y, median (IQR)	73(66-77)	69(61-76)	0.020	77(71-79)	69(62-76)	0.017
Male, n (%)	27(50.9)	98(60.5)	0.221	10(45.5)	115(59.6)	0.203
Past Medical History, n (%)						
Hypertension	29(54.7)	98(60.5)	0.458	13(59.1)	114(59.1)	0.998
Diabetes mellitus	3(5.7)	19(11.7)	0.297	2(9.1)	20(10.4)	1.000
Atrial fibrillation	39(73.6)	85(52.2)	0.007	19(86.4)	105(54.4)	0.005
Clinical data						
Admission SBP, median (IQR)	148(134-168)	154(140-169)	0.247	149(128-166)	153(140-169)	0.219
Admission DBP, median (IQR)	84(76-90)	84(75-94)	0.692	87(71-91)	84(75-93)	0.554
Admission NIHSS, median, (IQR)	14(12-17)	13(11-18)	0.230	15(12-18)	13(11-18)	0.114
Admission ASPECT, median, (IQR)	7(4-9)	9(8-10)	<0.001	7(3-9)	9(7-10)	<0.001
IV-rtPA, n (%)	13(24.5)	19(11.7)	0.023	6(27.3)	26(13.5)	0.085
Occlusion site, n (%)			0.061			0.067
ICA	28(52.8)	63(38.9)		11(50.0)	80(41.5)	
MCA-M1	19(35.8)	88(54.3)		7(31.8)	100(51.8)	
MCA-M2	6(11.3)	11(6.8)		4(18.2)	13(6.7)	
TOAST type, n (%)			0.001			-
LAA	5(9.4)	52(32.1)		0(0.0)	57(29.5)	
CE	43(81.1)	90(55.6)		22(100%)	111(57.5)	
Others	5(9.4)	20(12.3)		0(0.0)	25(13.0)	

Anesthesia mode, n (%)			0.484			0.508
General Anesthesia	8(15.1)	16(9.9)		4(18.2)	20(10.4)	
Local Anesthesia	28(52.8)	98(60.5)		12(54.5)	114(59.1)	
Conscious Sedation	17(32.1)	48(29.6)		6(27.3)	59(30.6)	
Procedure process						
OTP, median (IQR)	335(260-420)	290(205-360)	0.010	330(290-367)	300(210-390)	0.075
OTR, median (IQR)	386(315-510)	347(260-423)	0.008	392(351-453)	350(268-447)	0.046
Collateral, n (%)			0.027			0.012
poor	23(43.4)	44(27.2)		12(54.5)	55(28.5)	
good	30(56.6)	118(72.8)		10(45.5)	138(71.5)	
First Attempt Approach, n (%)			0.052			0.158
Stent retriever	17(32.1)	42(25.9)		5(22.7)	54(28.0)	
Direct aspiration	30(56.6)	72(44.4)		14(63.6)	88(45.6)	
Stent retriever + aspiration	2(3.8)	11(6.8)		2(9.1)	11(5.7)	
Balloon/stenting angioplasty	4(7.5)	37(22.8)		1(4.5)	40(20.7)	
eTICI			0.641			0.212
2b50 (50-66%)	7(13.2)	21(13.0)		5(22.7)	23(11.9)	
2b67 (67-89%)	9(17.0)	18(11.1)		4(18.2)	23(11.9)	
2c	9(17.0)	24(14.8)		1(4.5)	32(16.6)	
3	28(52.8)	99(61.1)		12(54.5)	115(59.6)	
mCCT, sec, median (IQR)	3.9(3.1-4.7)	3.4(2.9-4.2)	0.025	4.2(3.0-4.5)	3.4(3.0-4.4)	0.093

Abbreviations: ASPECT, Alberta Stroke Program Early CT; CE, cardioembolic; DBP, diastolic blood pressure; eTICI, expended Thrombolysis in Cerebral Infarction; ICA, internal carotid artery; ICH, intracerebral hemorrhage, IQR, interquartile range; IV-rtPA, intravenous alteplase; LAA, large-artery atherosclerosis; MCA-M1, M1 segment of the middle cerebral artery; MCA-M2, M2 segment of the middle cerebral artery; mCCT,

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microvascular cerebral circulation time; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; OTP,

onset-to-puncture time; OTR, onset-to-reperfusion time; SBP, systolic blood pressure; SD, standard deviation; TOAST, the Trial of ORG 10172

in Acute Stroke Treatment

Table S4 Logistic Regression Analyses for Intracerebral Hemorrhage

Independent variable	Aadjusted OR(95%CI)	P-value
Any ICH		
Age	1.014(0.975-1.056)	0.483
Admission ASPECT	0.756(0.645-0.885)	0.001
IV-rtPA	3.605(1.384-9.392)	0.009
TOAST		
LAA	Reference	
CE	6.040(1.789-20.394)	0.004
Others	2.636(0.613-11.324)	0.193
OTR	1.002(1.000-1.004)	0.019
Collateral	1.417(0.607-3.305)	0.420
mCCT	1.103(0.796-1.528)	0.556
Parenchymal hematoma		
Age	1.017(0.956-1.082)	0.593
Atrial fibrillation	3.072(0.661-14.290)	0.152
Admission ASPECT	0.725(0.597-0.881)	0.001
OTR	1.001(0.999-1.004)	0.372
Collateral	0.951(0.320-2.825)	0.928
mCCT	1.085(0.708-1.661)	0.708

Abbreviations: ASPECT, Alberta Stroke Program Early CT; CE, cardioembolic; CI, confidence intervals; ICH, intracerebral hemorrhage; IV-rtPA, intravenous alteplase; LAA, large-artery atherosclerosis; mCCT, microvascular cerebral circulation time; OR, odds ratio; OTR, onset-to-reperfusion time; TOAST, the Trial of ORG 10172 in Acute Stroke Treatment

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Table S5 Kendall's W test for TTP and CCT

Independent variable	Kendall's W	P-value
TTP_{C5}, sec	0.952	<0.001
TTP_{M4}, sec	0.965	<0.001
TTP_{VR}, sec	0.948	<0.001
CCT_{C5-M4}, sec	0.946	<0.001
CCT_{C5-VR}, sec	0.945	<0.001
CCT_{M4-VR}, sec	0.919	<0.001

Abbreviations: CCT_{C5-M4}, cerebral circulation time from the vertical intracavernous portion of the internal carotid artery to the cortical segment of the rolandic artery; CCT_{C5-VR}, cerebral circulation time from the vertical intracavernous portion of the internal carotid artery to the rolandic vein; CCT_{M4-VR}, cerebral circulation time from the cortical segment of the rolandic artery to the rolandic vein; TTP_{C5}, time to peak of the vertical intracavernous portion of the internal carotid artery, TTP_{M4}, time to peak of the cortical segment of the rolandic artery; TTP_{VR}, time to peak of the rolandic vein.